
South Dakota Counts

Program Abstract

SOUTH DAKOTA COUNTS is a focused statewide professional development program designed to build broad-based expertise and leadership for improving K-5 elementary mathematics instruction, which will address Goal 1 of Governor Round's 2010 Education Initiative. South Dakota Counts will leave the statewide educational community with a cadre of very skilled professionals to serve as resources and trainers in the ongoing effort to improve elementary mathematics instruction and student achievement.

OBJECTIVES:

During the next three years, South Dakota Counts will:

- Increase overall student achievement in mathematics education.
- Increase student achievement in both socioeconomic and Native American subgroups.
- Train and place one Mathematics Specialist in up to 9 different sites in South Dakota.
- Provide training for one Mathematics Teacher Leader for potentially each elementary building in South Dakota.
- Support work in each participating district to train additional interested K-5 teachers.
- Conduct training for building principals to support the work of the math teacher.

RATIONALE:

The research is clear that a skilled teacher is the most important factor in improving student learning. South Dakota Counts is designed to deepen and broaden teachers' knowledge base about mathematics content, mathematics pedagogy, and student mathematical thinking. South Dakota Counts will provide teachers an opportunity to experience "best practices" in teaching mathematics. This will include constructivist instructional practices that promote mathematical reasoning, discourse, inquiry, and conceptual understanding for all students. In order to answer the question of why do we need an elementary math initiative National Assessment of Educational Progress (NAEP) and Dakota State Test of Educational Progress (Dakota STEP) data was analyzed at the fourth grade level by the Math Advisory Committee, which consisted of Anne Thompson, Math Curriculum Specialist, DOE; Tammy Bauck, DOE; Michelle Mehlberg, DOE; Merry Bleeker, Stanley County School District; Jan Martin, Todd County School District; Suzanne Hegg, Rapid City School District; Ben Sayler, CAMSE, Nancy Ward, Rapid City School District; Pat Peel, Rapid City School District, Michele Perrizo, Aberdeen School District; and Roxie Albrecht, Sioux Falls School District.

The Math Advisory Committee determined current NAEP and Dakota STEP data supports the need for a math initiative in the state of South Dakota that targets instructional strategies that work with all students including those of low socioeconomic status and Native American students. Although students of low socioeconomic status and Native American students both have made gains in achieving the proficient or advanced levels on recent assessments they are still far behind the state average in growth as evidenced by the NAEP and Dakota STEP graphs in Appendix A. The data also shows a significant gap between those students eligible for free and reduced meals compared to non-eligible students.



South Dakota is not alone in this quest to increase student math scores. In his State of the Union Address on January 31, 2006, President Bush stressed a need for global competitiveness that starts with improved mathematics and science education for American students.

The January 11, 2006 Education Week online publication showcased the two city districts that made the greatest strides in math on the latest national assessment. It is interesting to note that both districts relied on similar strategies: building students' conceptual math skills and investing in professional development in that subject for elementary and middle school teachers. Administrators from both districts believe that their approach is giving students greater ability to solve a broad variety of math problems and preparing them for more complex mathematics later in school. Both districts' math efforts have received grant money in recent years through the National Science Foundation. The independent federal agency has been a strong supporter of conceptual math.

Both of these examples along with the findings of the Math Advisory Committee indicate that South Dakota is moving in the right direction with the Elementary Math Initiative, South Dakota Counts.

TARGETED AUDIENCES:

- Math Specialist at each site awarded a grant
- Elementary Math Teacher Leader in potentially each school district in South Dakota
- K-5 Elementary Mathematics Teachers, including Special Education and Title I teachers
- Elementary Principals

IMPACT ON INSTRUCTION:

Based on data from the research and current state events, the Math Advisory Committee determined that Cognitively Guided Instruction (CGI) was the model to follow for a statewide initiative. The importance of focusing attention on the educational needs and strengths of all students including both students of low socioeconomic status and Native American students in mathematics through concerted efforts to improve academic outcomes is supported by the CGI model. (see Appendix B) Commitment to high standards in mathematics all students can be successfully achieved through strong research based instructional strategies and professional development for teachers in mathematics which is provided by the framework within the CGI model.

Impact on Teacher Instruction:

Basic Math Instruction

- learn more mathematics content
- learn to define and select mathematical objectives for their students
- learn to recognize key mathematical ideas with which their students are grappling
- learn how to support children's mathematical thinking
- learn to appreciate the power and complexity of student thinking
- learn how to ask questions that will help students deepen their mathematical understanding
- learn how to analyze a piece of curriculum for the mathematics students will learn from it
- learn to make more mathematical connections for themselves, enhancing their ability to help their students do so
- learn how to continue learning about children and mathematics

Cognitively Guided Instruction (GCI):

- professional development program for K-5 teachers
- use existing textbooks and curriculum
- connecting students prior knowledge of mathematics to instruction
- connect students skills to problem solving
- Restructure math instructional philosophy

Impact on Administrator Leadership:

- gives administrators the opportunity to sort out their initial thoughts and reactions to these ideas and to begin to consider their implications for their own work.
- explore some of the norms and values that are embedded in Standards-based mathematics education and how these connect to school and district culture, and to their own leadership roles.
- explore the topic of mathematics professional development in their schools.
 - consider what teachers need to learn about mathematics
 - identify what meaningful professional development is
 - explore what kinds of support is needed for mathematics teachers
- provides administrators with the opportunity to develop an “eye” for Standards-based elementary mathematics classrooms

Participation in South Dakota Counts will enable teachers and administrators to more effectively impact students in the area of mathematics. Teachers will develop a deeper knowledge and understanding of mathematics and how students learn mathematics. Administrators will develop a better understanding of how to effectively support mathematics instruction in their buildings and skilled teachers and administrators will ultimately lead to positive student outcomes and increased student achievement.

EVALUATION:

The evaluation will be conducted by an outside evaluation firm. The evaluation will focus on two specific outcomes for the project. First, the evaluation will judge how well the leadership structure of regional math specialists and district teacher leaders works to improve math instruction. Secondly, the evaluation will assess changes in classroom practice. Both of these program outcomes will be evidenced by growth in student achievement in mathematics based on a higher percentage of students attaining results in the proficient and advanced categories on the Dakota STEP assessment.

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Program Timeline

TIMELINE

The work will begin in March 2006 and end in July 2009.

March 2006	SDDOE, TIE and CAMSE begin the planning for spring and summer events.
February 2006	RFP is made available
March 2006	RFP submitted
April 2006	Planning is complete
May 2006	DOE makes announcement of awards
May 2006	Math Specialist positions are posted
June 2006	Math Specialist positions are filled

YEAR 1

July 2006	First summer institute for Math Specialists
Summer 2006	Year 1 Advisory Committee Meeting
September 2006	District level Teacher Leaders are identified
Fall 2006	Fall training for Math Specialists and Teacher Leaders
Winter 2006	Advisory Committee meeting
Spring 2007	Training for Elementary Principals
Spring 2007	Spring training for Math Specialists and Teacher Leaders

YEAR 2

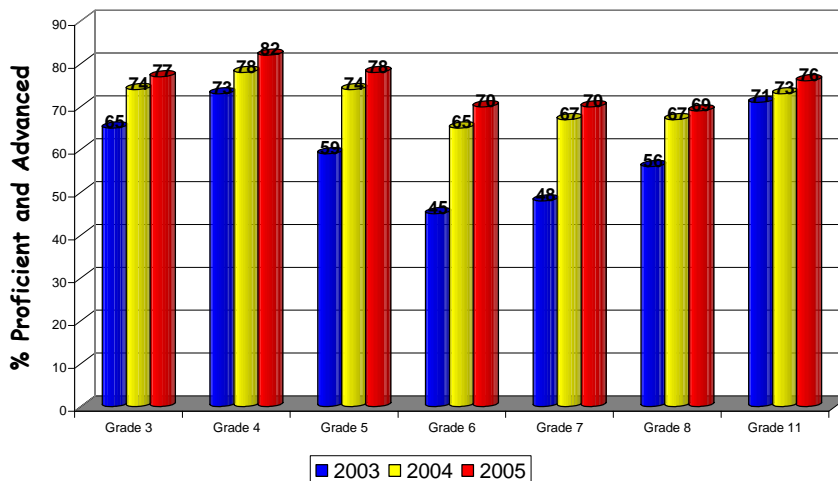
Summer 2007	Summer institute for Math Specialists and Teacher Leaders
Fall 2007	Evaluation site visits
Fall 2007	Fall training for Math Specialists and Teacher Leaders
Fall 2007	Training for Elementary Principals
Winter 2007	Advisory Committee meeting
Spring 2008	Spring training for Math Specialists and Teacher Leaders
Spring 2008	Training for Elementary Principals

YEAR 3

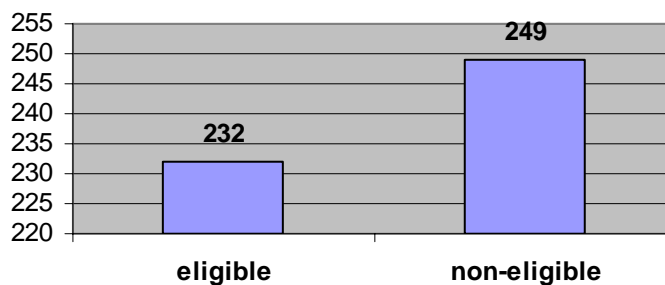
Summer 2008	Summer institute for Math Specialists and Teacher Leaders
Fall 2008	Evaluation site visits
Fall 2008	Fall training for Math Specialists and Teacher Leaders
Fall 2008	Training for Elementary Principals
Winter 2008	Advisory Committee meeting
Spring 2009	Spring training for Math Specialists and Teacher Leaders
Spring 2009	Training for Elementary Principals
Spring 2009	Evaluation site visits
July 2009	Final Summer Institute aimed at planning for sustaining the work at the ESA and district level

Appendix A

Dakota STEP Math Growth 2003-2005

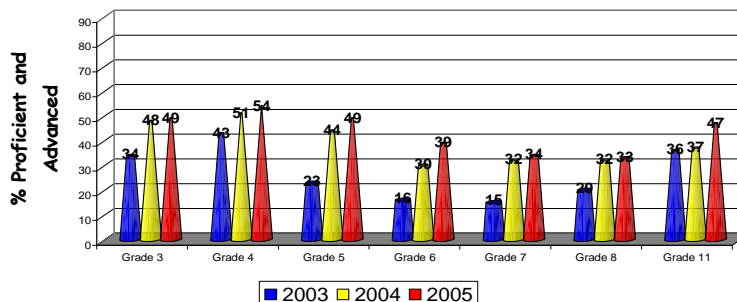


2005 SD 4th Grade Math NAEP Socioeconomic Data

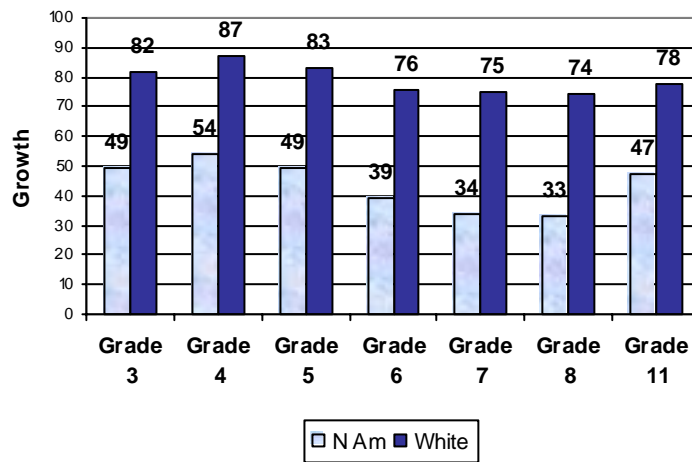


** data based on free and reduced information

Native American Student Score Growth Math



Dakota STEP Math Subgroup Score Comparison Native American and White Students 2005



Appendix B

COGNITIVELY GUIDED INSTRUCTION & SYSTEMIC REFORM NATIVE AMERICAN PEDAGOGY AND CGI

[judith e. hankes]

All six states served by the Comprehensive Center – Region VI have Native American populations. Some teachers of those students have attended CGI Institutes and have successfully implemented Cognitively Guided Instruction. Judith Hankes – herself Native American – actively promotes the use of CGI with Native American students because of the cultural compatibility of CGI principles and Native American pedagogy. She includes CGI in her classes for preservice teachers.

A COMPARISON OF PEDAGOGICAL PRINCIPLES	<i>Dominant Culture Pedagogy</i>	<i>CGI Pedagogy</i>	<i>Native American Pedagogy</i>
ROLE OF TEACHER	Teachers generally behave in a didactic manner, disseminating information to students.	Teachers generally behave in an interactive manner, mediating the environment for the student.	The facilitating teacher role promotes cooperative and autonomous learning. Conversational topics are not controlled by individual speakers.
STUDENT TO STUDENT INTERACTION	Students primarily work alone.	Students frequently work in groups and are encouraged to reflect on and discuss their own and other's thinking.	Caretaking patterns of extended families and bonded community interactions are replicated in group learning experiences.
CURRICULUM	Curriculum activities rely heavily on textbooks and workbooks.	Curricular activities rely heavily on primary sources of data and manipulative materials.	Lessons relate to real problems that will likely confront the student.
TIME	The day is partitioned into blocks of time and content coverage. Time on task is considered important.	Class time is spent solving complex problems. Students are encouraged to reflect on and discuss their own and other's thinking. This is often a time consuming process.	Instruction/learning is time-generous rather than time-driven. When an activity should begin is determined by when the activity that precedes it is completed.
CONCEPT FORMATION	Concepts are presented part-to-whole with emphasis on basic skills.	Concepts are presented whole-to-part with emphasis on big ideas.	All knowledge is relational, presented whole-to-part not part-to-whole. Just as the circle produces harmony, holistic thinking promotes sense-making.
VIEW OF LEARNER	Students are viewed as blank slates onto which information is etched by the teacher.	Students are viewed as thinkers with emerging theories about the world. Students are believed to possess prior knowledge.	Each student possess Creator-given strengths and is born a thinker with a life mission.
ASSESSMENT	Student assessment is viewed as separate from teaching and occurs almost entirely through testing. Testing often stratifies students and promotes competition.	Assessment is interwoven with teaching and occurs through questioning and observation of student work. Each student is instructed at her/his appropriate learning level. There is little, if any, use for competition.	Age and ability determine task appropriateness. Learning mastery is demonstrated through performance. Creator ordained mission determines one's role in life, and no one mission is better than another. Competition, situating one as better than another is discouraged.

The chart above is adapted from Dr. Hankes' book: Hankes, Judith E. (1998). *Native American Pedagogy and Cognitive Based Mathematics Instruction*. New York: Garland Press.